



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/525,779	09/30/2005	Peter Berenbrink	2002P14078WOUS	8492

7590 11/14/2008  
Siemens Corporation  
Intellectual Property Department  
170 Wood Avenue South  
Iselin, NJ 08830

EXAMINER
----------

PRICE, CARL D

ART UNIT	PAPER NUMBER
----------	--------------

3749

MAIL DATE	DELIVERY MODE
-----------	---------------

11/14/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/525,779	<b>Applicant(s)</b> BERENBRINK ET AL.	
	<b>Examiner</b> Carl D. Price	<b>Art Unit</b> 3749	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 05/28/2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 20-39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 20-39 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>05/28/2008</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### Response to Arguments

Applicant's arguments with respect to claims **20-39** have been considered but are moot in view of the new ground(s) of rejection.

Applicant has amended the claims to be of a scope not previously considered. Consistent with applicant's argument that the prior art relied on in the previous office action fail to show, disclose and/or teach certain aspects of applicant's invention now recited in the claims filed on **08/11/2008**, applicant has amended the claims to include at least the following:

20. (currently amended)

A burner, comprising:

**a means for providing a flow of compressed air and/or oxygen in a flow direction;**

**a means for creating a mixture comprising a concentration distribution of fuel in the compressed air and/or oxygen in an axis** perpendicular to the flow direction, wherein the concentration distribution is not constant **across the axis** in order to avoid combustion instabilities during operation of the burner; **and**  
**a means for imparting a swirl of the mixture about the flow direction, wherein an outflow angle of the swirled mixture varies in magnitude in a single direction across the axis perpendicular to the flow direction.**

33. (currently amended)

A burner, comprising:

**a means for providing a flow of compressed air and/or oxygen in a flow direction;** and

**a means for imparting a swirl of the mixture about the flow direction, wherein an outflow angle of the swirled mixture varies in magnitude in a single direction across an axis perpendicular to the flow direction.**

With respect to the prior art of record relied on by the examiner to reject the claims applicant's response includes the following remarks:

"Regarding independent claim 20, Becket teaches a choke ring that includes individual bars 13, which slow the flow in the region of the bars 13. (Col. 5, 11.48-49). Becker specifically teaches *"that the mixer for intermixing the fuel with the flow must be configured for the requisite homogeneity of the mixture produced."* (Col. 2, 11.60-62).

Further, Becket teaches selecting the size of the nozzle holes "in such a way that a *largely homogenous distribution of the fuel in the flow* is achieved." (Col. 5, tl. 62-64). Becker also teaches that if the bars 13 are not present in the structure, "nozzles of different size are also *not required* for feeding the fuel." (Col. 6, ll. 4-6). The bars 13 significantly change the characteristics of the flow, and cannot be ignored. If bars 13 were removed and nozzles 11 were left to vary in size, resulting in Applicant's configuration, the resulting flow in Becker would not be homogenous, which is the exact opposite of what Becker seeks. In contrast, in independent claim 20, Applicant claims "a means for creating a mixture comprising a concentration distribution of fuel in the compressed air and/or oxygen in an axis perpendicular to the flow direction, *wherein the concentration distribution is not constant* across the axis" Hence, the structure in Becket does not anticipate Applicant's independent claim 20."

The examiner disagrees with applicant's suggestion that the claim recitation "a means for creating a mixture comprising a concentration distribution of fuel in the compressed air and/or oxygen in an axis perpendicular to the flow direction, *wherein the concentration distribution is not constant* across the axis" distinguishes the claimed invention from the prior art of Becker , since "Becker teaches selecting the size of the nozzle holes 'in such a way that a *largely homogenous distribution of the fuel in the flow* is achieved.'" On the contrary, as previously noted in the examiners action, Becker explicitly states the following:

"This results in the stabilizing effects, already described at the beginning, on the combustion taking place in the combustion chamber 7, to the above explanation of which reference is hereby made. The feeding of the fuel 6 to the flow 5 must take into account the non-uniform distribution of the velocity in the flow 5. Therefore, large nozzles 11 are provided for feeding the fuel to the largely unaffected portion of the flow and small nozzles 12 are provided for feeding the fuel 6 to the slowed-down portion of the flow 5."

In this regard it is noted that Becker uses a distribution of large and small nozzles positioned along an axis radially, or perpendicular, oriented with respect to the oxidant flow axis. As such, the concentration distribution is not constant across the axis, at least at points in the oxidant flow path adjacent to the nozzle locations and for at least some distance along the mixture flow. It is further noted that the recitation in Becker that the size of the nozzle holes are selected "in such a way that a *largely homogenous distribution of the fuel in the flow* is achieved". That is, since the recitation "*largely*" homogenous does not preclude a circumstance where the "*the concentration distribution is not constant*". Since Becker does not state that the distribution fuel in the flow is entirely homogeneous, or entirely uniform.

Applicant further argues that “Althaus teaches swirl blades imparting a direction change in the flow, but that direction change is different from what Applicant claims.” That is, since the edge imparts two different outflow angles with an abrupt transition between the two. In this regard applicant’s attention is now directed to the prior art references of US **0746525 (Knobs)** and **US 1086715 (Irish)**.

In response to applicant's argument that Becker does not teach the limitation of Applicant's amended claim 20 (i.e. – an outflow angle of the swirled mixture varies in magnitude in a single direction across the axis perpendicular to the flow direction) “so Becker cannot teach varying nozzle sizes together with such a flow configuration”, applicant is reminded that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

#### **Claim Rejections - 35 USC § 112**

**Claims 20-39** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. These claims failing to particularly point out the invention since it is not accurate to state that the means for creating a mixture “comprises” a concentration distribution of fuel “in” an axis since the fuel concentration and distribution occurs along, or across, the length of a perpendicular axis. These claims failing to particularly point out the invention since it is not accurate to describe the means for imparting a swirl varying in magnitude “across the axis perpendicular to the flow direction”. That is, since the “an axis” is defined with regard to the means creating a concentration distribution mixture (e.g. – the axis of conduit 64) which is not the same perpendicular orientation, or location, as the means (61) defining the “an outflow angle” which varies in magnitude in a radial direction perpendicular to the burner axis. In claim 38, the recitation “the swirl blade has different outflow angles, wherein the outflow angle varies in magnitude in a single direction across an axis perpendicular to the flow direction” is redundant with the same recitation in claim 33.

**Claim Rejections - 35 USC § 102**

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

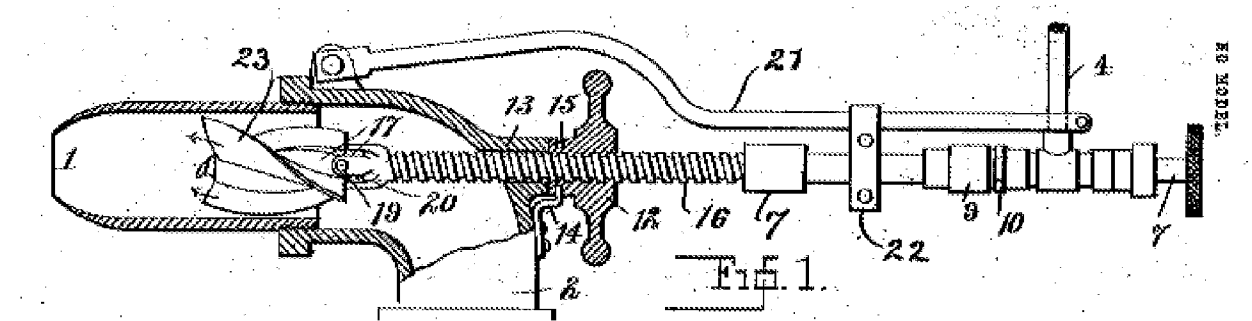
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 33-35** are rejected under 35 U.S.C. 102(b) as being anticipated by **US 0746525 (Knobs)**.

**US 0746525 (Knobs)** shows and discloses a burner, comprising:

- a means for providing a flow of compressed air (2) in a flow direction;
- a means for imparting a swirl (23; spiral vanes) of the mixture about the flow direction, wherein an outflow angle of the swirled mixture varies in magnitude in a single direction across the axis perpendicular to the flow direction.



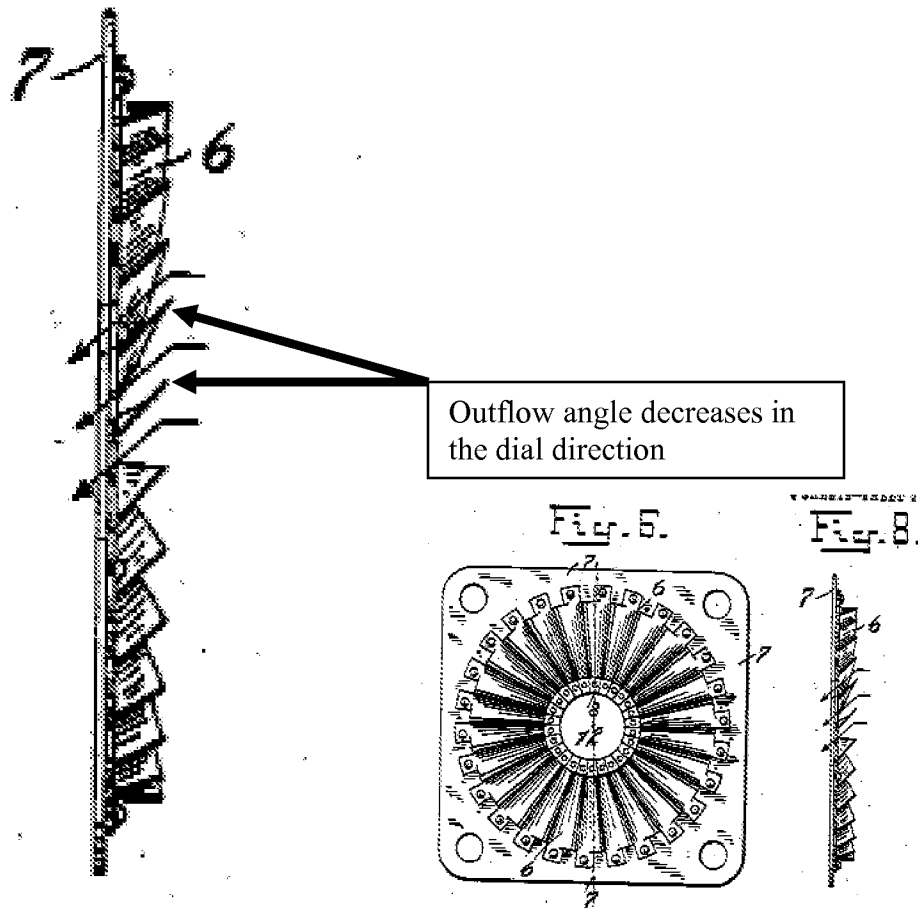
**Claims 33-39** are rejected under 35 U.S.C. 102(b) as being anticipated by **US 1086715 (Irish)**.

**US 1086715 (Irish)** shows (figure 8) and discloses a burner, comprising:

- a means for providing a flow of compressed air (13) in a flow direction;

Art Unit: 3749

- a bladed disk means for imparting a swirl 6; spiral vanes) of the mixture about the flow direction, wherein an outflow angle of the swirled mixture varies in magnitude in a single direction across the axis perpendicular to the flow direction.

**Fig. 8.**

**Allowable Subject Matter**

**Claim 20** would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

Art Unit: 3749

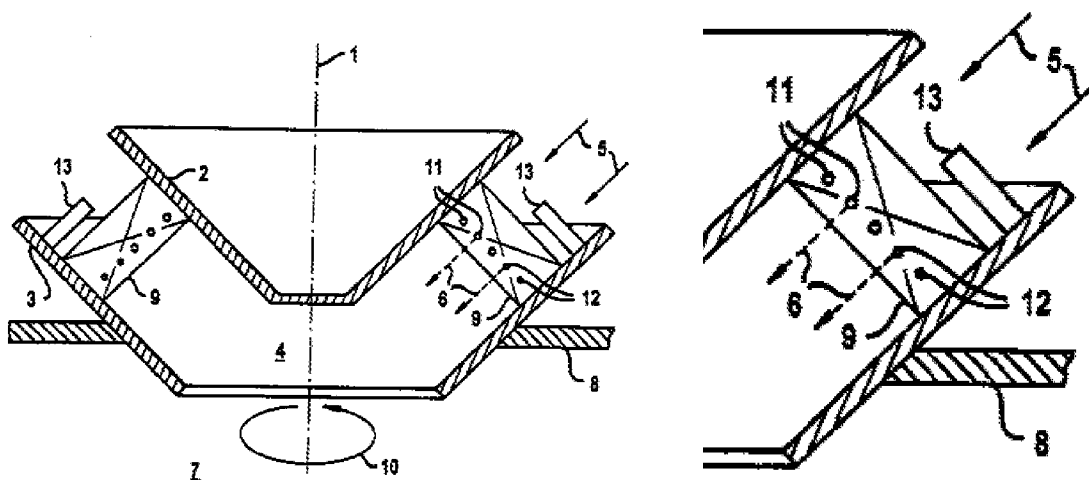
**Claims 21-32** would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

### **Conclusion**

See the attached USPTO for, 892 for prior art made of record and not relied upon which is considered pertinent to applicant's disclosure.

**US 5647200 (Althaus)** teaches, from the same burner field of endeavor as **US 6152724 (Becker)**, forming a fuel injector swirl blade with the outflow angle decreasing (oppositely angled) in the radial direction from the interior to the exterior, for the purpose of forming a stable back-flow zone in the combustion area.

**US 6152724 (Becker)** shows and discloses.



**FIG 1**

(13) Whether the premix burner embodied as such a device in the individual case requires stabilization by a so-called pilot flame, as known from the prior art cited, and whether this pilot flame is disposed in the center or at the outer periphery of the flow, or whether the premix burner needs a pilot flame at all, is of secondary importance here. The same applies to the configuration of the swirl cascade; this may be an axial, radial or diagonal swirl cascade in accordance with the requirements of the respective individual case. Details for the feeding of the fuel are also of secondary importance here; in principle, the fuel may be fed in any manner, for example via nozzles in guide blades of the swirl cascade or separate mixing devices in front of or behind the swirl cascade.

Art Unit: 3749

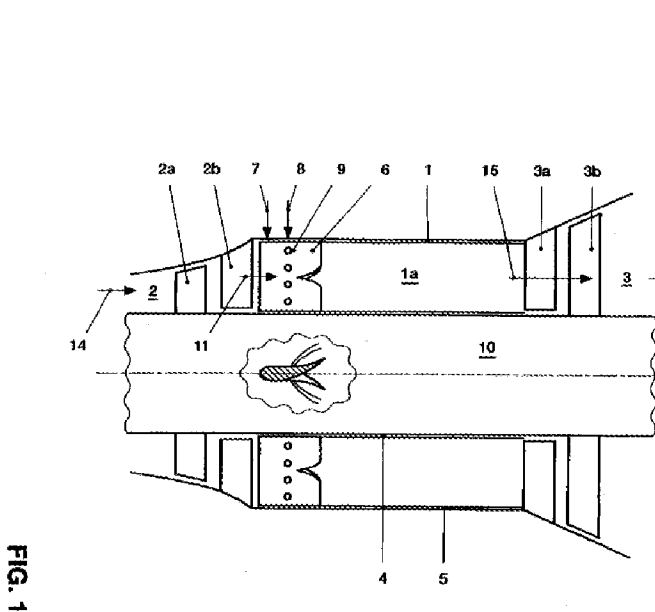
(5) **FIGS. 1 and 2** each show a premix burner having an axis 1, an inner body 2 disposed centrically with regard to the axis 1, and an outer body 3 likewise disposed centrically with regard to the axis 1 and surrounding the inner body 2. An annular passage 4 through which a flow 5 of air is directed lies between the inner body 2 and the outer body 3. In the annular passage 4, the air is mixed with fuel 6 to form a mixture, which flows into a combustion space 7 and burns there. An ignition device for igniting the mixture is not shown for the sake of clarity. Within the limits of conventional practice, which prefers a plurality of premix burners for a combustion space 7, an ignition device is not required for each burner, but a single ignition device suffices for all burners. In this sense, an ignition device is therefore not an integral part of an individual premix burner, for which reason the omission of an ignition device from the figures is also justified. The premix burner is let into a combustion space wall 8, which closes off the combustion space 7 upstream of the flow 5. Disposed in the annular passage 4 is a swirl cascade 9 consisting of guide blades 9, which serves to impose a swirl 10 on the flow 5. **Nozzles 11 and 12** are provided in the **guide blades 9** in order to feed the fuel 6 to the flow 5. The device for **feeding the fuel 6 to the nozzles 11 and 12** are not shown for the sake of clarity. A pilot burner, which may possibly be useful or necessary for operating the premix burner and delivers a special flame that helps to stabilize the combustion of the mixture of air and fuel, is also not shown. Such a pilot burner may be necessary if the premix burner is to be operated under fluctuating mixture ratios of air and fuel, since a comparatively lean mixture may possibly no longer ignite in a reliable manner without assistance. As already explained, whether to use or not to use a pilot burner is at the discretion of the persons skilled and active in the relevant art.

(6) An exemplary embodiment of the invention is shown **in FIG. 1**. Within the scope of the exemplary embodiment, a choke ring 13 consisting of individual bars attached to the outer body 3 and projecting into the annular passage 4 is provided in front of the swirl cascade 9. The bars cause local pressure losses in the flow 5 and lead to the outer portion of the flow 5, which passes close to the outer body 3, being slowed down or delayed relative to other portions of the flow 5. The slowing down continues through the entire annular passage 4 and leads to a non-uniform distribution of the velocity in the mixture, which flows off into the combustion space 7. This results in the **stabilizing effects**, already described at the beginning, on the combustion taking place in the combustion chamber 7, to the above explanation of which reference is hereby made. The feeding of the fuel 6 to the flow 5 must take into account the non-uniform distribution of the velocity in the flow 5. Therefore, **large nozzles 11** are provided for feeding the fuel to the largely unaffected portion of the flow and **small nozzles 12** are provided for feeding the fuel 6 to the **slowed-down portion of the flow 5**. **The dimensions of the nozzles 11 and 12 are to be selected in such a way that a largely homogeneous distribution of the fuel in the flow is achieved and thus combustion having as low a production of nitrous oxide as possible is ensured.** For appropriate construction of the device, computer programs for the numerical modeling of the flow 5 are available to the persons skilled and active in the relevant art, the utilization of which computer programs permits an appropriate configuration of the nozzles 11 and 12.

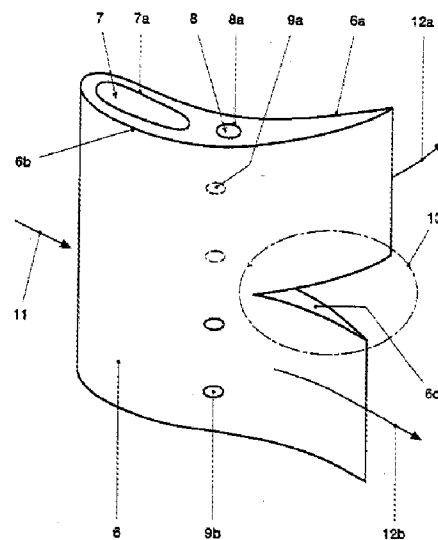
(8) To **stabilize the combustion** of a premix burner, it has been proposed to envelope the igniting mixture flowing from the burner with a veil of air and thus prevent vortices from forming in marginal regions of the mixture, in which vortices combustion processes take place, from which it may be assumed that they contribute substantially to the destabilization of the combustion. However, a disadvantage of the proposed measure may be seen in the fact that the

air which is used to envelope the mixture has to be extracted from the actual combustion operation. If the thermal output to be released by the premix burner is fixed, the quantity of fuel to be used is also essentially fixed, and a withdrawal of air for stabilizing the combustion results in the actual combustion taking place in the presence of a reduced quantity of air and, in view of the fact that the combustion, in particular in a **gas-turbine plant**, is effected as a rule with excess air, must proceed with a markedly increased maximum temperature and thus with a markedly increased formation of nitrous oxides.

**US 5647200 (Althaus)** shows and discloses:



**FIG. 1**



**FIG. 2**

(2) ... With arrangements of this type it is necessary to take precautions that the flame front from the combustion chamber 1a of the heat generator 1 cannot migrate upstream, i.e. flash-back of the flame in the direction toward the high-pressure turbine 2 must be prevented. It would be disadvantageous here to provide any flame traps downstream of the high-pressure turbine 2. Considering what has already been pointed out, the support herein proposed therefore assumes the function of a vortex generator by means of a special design, which is able to form a **stable back-flow zone**. ...

(3) FIG. 2 shows the support 6 in a perspective view. Intrinsically, the support 6 has the shape of a guide vane. In the place where the combustion air 11 flows in, the support 6 has an interior conduit 7a, through which the air 7, described in connection with FIG. 1 flows. A further conduit 8a is disposed along a plane at approximately the center of the flow, through which **the fuel 8 flows**. The support 6 in the form of a guide vane is divided by a notch 13, which divides the support into two diverging portions. In the direction of flow this includes approximately the rear half of the guide vane in such a way that the upper half of the guide vane has an uninterrupted profiling of the **underpressure surface 6a** and the **overpressure surface 6b**, while the lower rear half of the guide-vane-shaped support 6 is offset in relation to this, i.e. the profile of the overpressure surface 6b makes a transition into the underpressure

Art Unit: 3749

surface 6c. The flow 11 impacting on the support 6 is split at the beginning of the offset notch 13 into two diverging partial flows 12a, 12b. Fuel nozzles 9a, 9b, shown here by means of openings, act in the area of the beginning notch 13. The fuel 8 supplied through the conduit 8a and, if required, mixed with or supported by air, flows through these fuel nozzles into the combustion chamber 1a of the heat generator 1 and there triggers self-ignition by means of the hot combustion air 11. The fuel nozzles 9a, 9b are evenly distributed within the radial extent of the support 6, either on both sides of the support 6 or only on the respective underpressure sides 6a, 6c, as can be seen in FIG. 2. The vortices generated in the flow direction by the diverging portions of the support not only accelerate the mixture of fuel 8 and combustion air 11 in the near area of the support, which triggers a short mixing length and accordingly direct self-ignition, but in the remote area, i.e. in the further combustion chamber 1a of the heat generator 1, they also additionally smooth out the concentration and temperature differences which are responsible for an increase in noxious matter emissions. Viewing this from the point of efficiency it can be said that the said compensation operates with minimal pressure losses, which results in an increased output of the downstream turbine. It is of course also possible to provide intermittent underpressure surfaces, i.e. a plurality of notches 13, over the height of the support 6 in connection with a desired vortex generation.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

#### **USPTO CUSTOMER CONTACT INFORMATION**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carl D. Price whose telephone number is (571) 272-4880. The examiner can normally be reached on Monday through Friday between 9:00am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven B. McAllister can be reached on (571) 272-6785. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 3749

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Carl D. Price/

Primary Examiner, Art Unit 3749

cp